

NCEI WATER LEVEL REPORT – Tsunami

UPDATE

February 24, 2022

Services

Analysis of January 15, 2022, Tonga Event

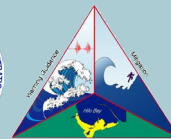
NCEI is responsible for archiving, processing, and disseminating tsunami water level data from the National Data Buoy Center's (NDBC) Deep-ocean Assessment and Reporting of Tsunamis (DART) network, the Center for Operational Oceanographic Products and Services (CO-OPS) tsunami capable tide stations, and the Tsunami Warning Centers' (NTWC and PTWC) tide stations. NCEI/CIRES scientists' quality-controlled and de-tided data capturing tsunami waves generated by the eruption of the Hunga Tonga – Hunga Ha'apai volcano. Analysis was completed on tsunami waves observed at DARTs in the Pacific, as well as coastal tide gauge stations operated by CO-OPS in the Pacific, Caribbean, and U.S. East Coast. No water level data from NTWC coastal stations were received by NCEI during the event. Currently, NCEI receives water level data from PTWC coastal stations in Hawaii once per year (January), so PTWC station data are not included here. The largest coastal observations (at CO-OPS stations) of the maximum tsunami wave (MTW), defined in Dunbar et al. 2017, were made at the following stations:

NOS Station ID	Station Name	MTW Peak-to-Trough [m]
1615680	Kahului Harbor, Maui, Hawaii	1.65
9412110	Port San Luis, California	2.62
9415020	Point Reyes, California	1.83
9416841	Arena Cove, California	2.13
9419750	Crescent City, California	1.98
9459881	King Cove, Alaska	1.91

The [January 15th tsunami water level webpage](#) provides public access to the quality-controlled and de-tided data.

**Aaron Sweeney (Technical Lead), George Mungov (Research Lead),
and Lindsey Wright (Marigram Specialist)**

Cooperative Institute for Research in Environmental Sciences (CIRES)
University of Colorado, Boulder
and National Centers for Environmental Information (NCEI) Boulder, CO
Contact: haz.info@noaa.gov



Services (cont'd)

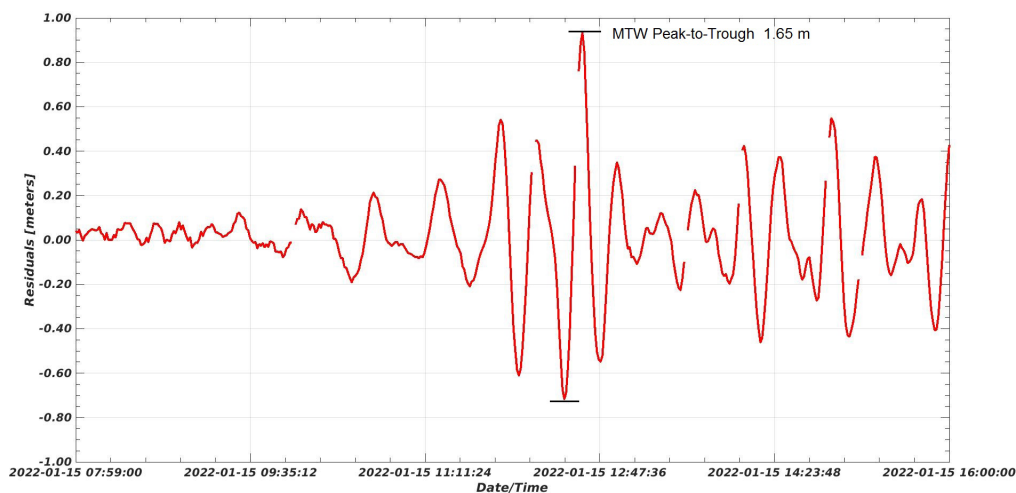


Figure 1: Water levels at Kahului Harbor, Maui, Hawaii (NOS ID 1615680), with tide removed (i.e. “residuals”). Markings indicate the peak and trough of the maximum tsunami wave (MTW).

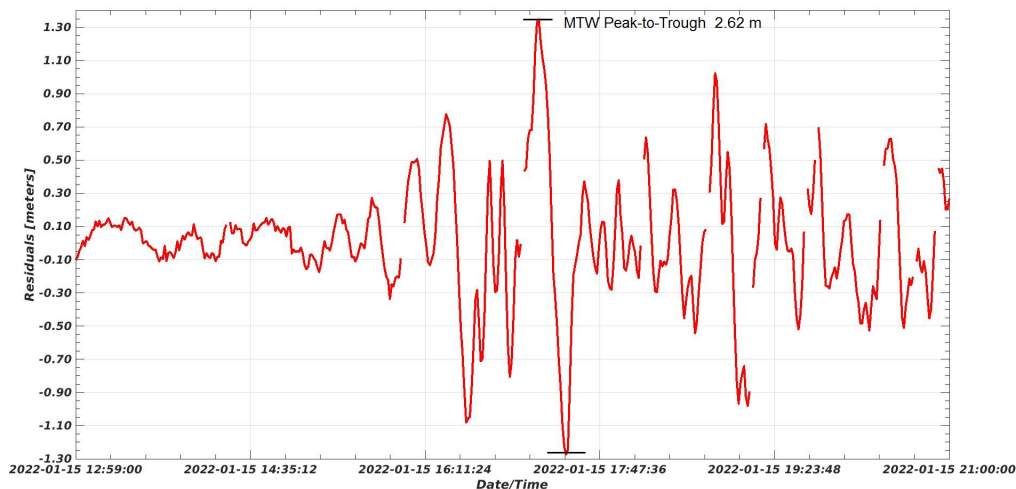


Figure 2: Water levels at Port San Luis, California (NOS ID 9412110), with tide removed (i.e. “residuals”). Markings indicate the peak and trough of the maximum tsunami wave (MTW).

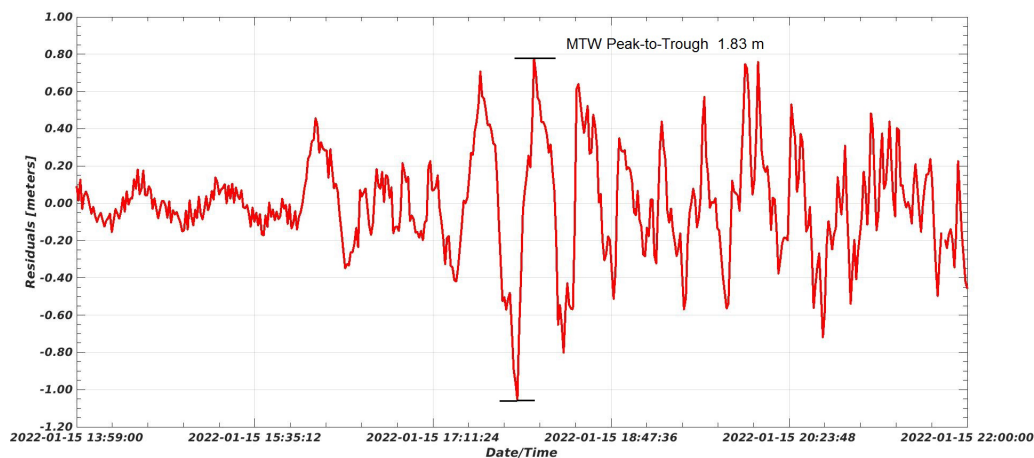


Figure 3: Water levels at Point Reyes, California (NOS ID 9415020), with tide removed (i.e. “residuals”). Markings indicate the peak and trough of the maximum tsunami wave (MTW).

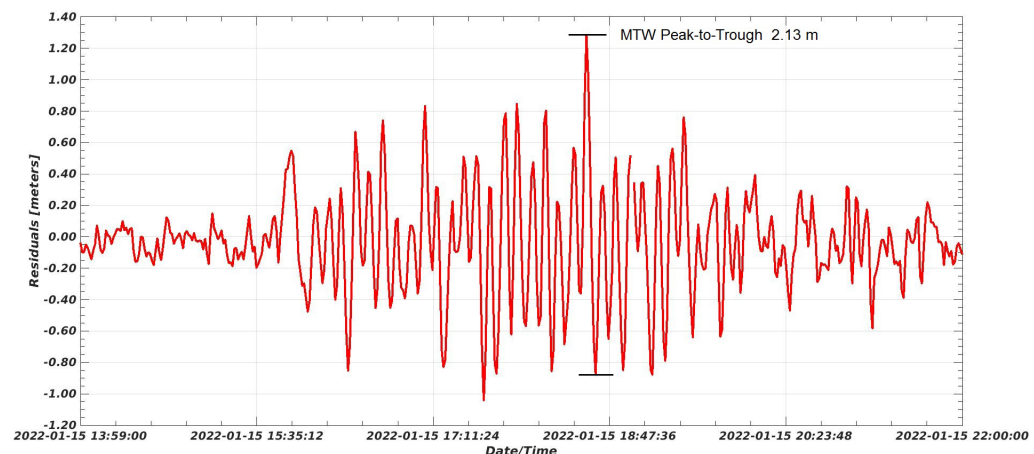


Figure 4: Water levels at Arena Cove, California (NOS ID 9416841), with tide removed (i.e. “residuals”). Markings indicate the peak and trough of the maximum tsunami wave (MTW).

Services (cont'd)

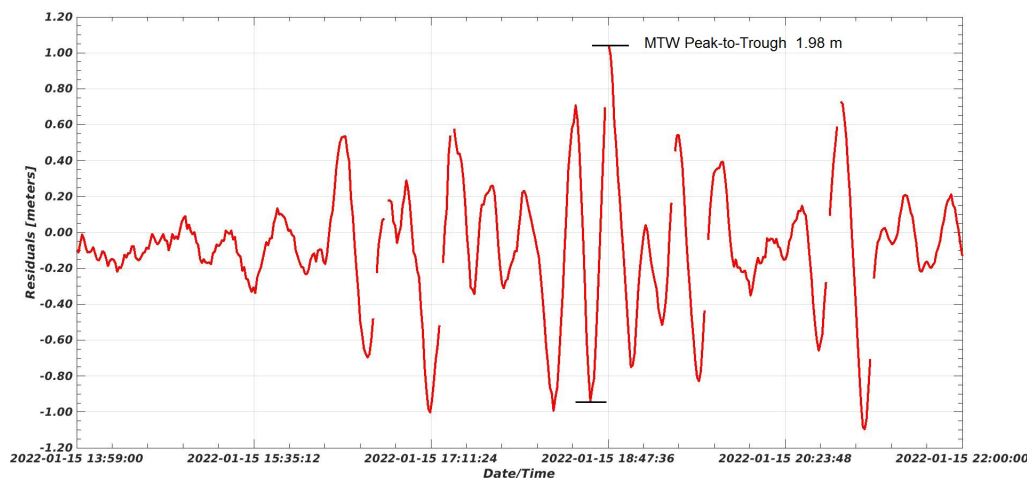


Figure 5: Water levels at Crescent City, California (NOS ID 9419750), with tide removed (i.e. “residuals”). Markings indicate the peak and trough of the maximum tsunami wave (MTW).

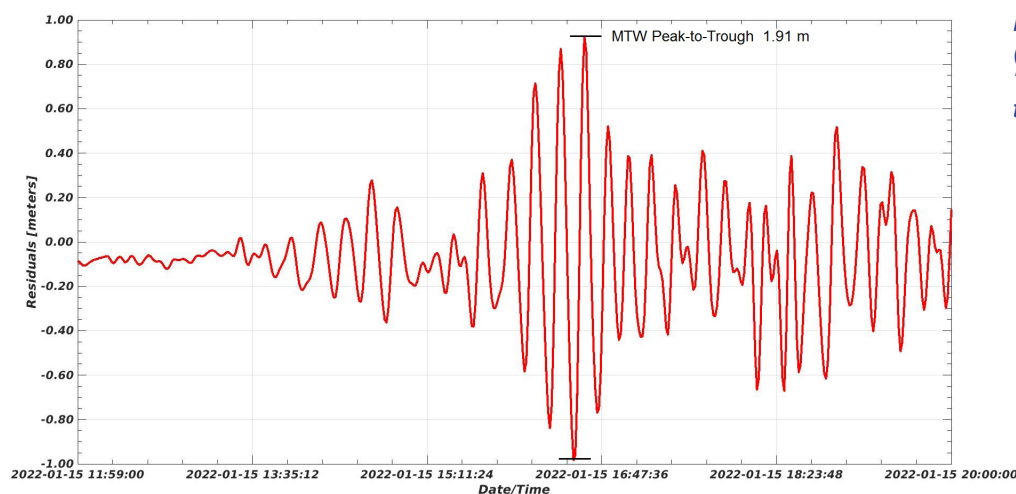


Figure 6: Water levels at King Cove, Alaska (NOS ID 9459881), with tide removed (i.e. “residuals”). Markings indicate the peak and trough of the maximum tsunami wave (MTW).

Publication on Identifying Gaps in Archived Tsunami Water Levels

In December, an article written by CIRES author Aaron Sweeney titled, “[Timeline Visualization Uncovers Gaps in Archived Tsunami Water Level Data](#),” was published in *Frontiers in Climate – Climate Services*. The article describes the successful identification and backfilling of data gaps in the archival record of both DART ocean bottom pressure and coastal tide gauge measurements using a timeline visualization.

References

Dunbar, P., G. Mungov, A. Sweeney, K. Stroker, and N. Arcos. Challenges in Defining Tsunami Wave Heights. *Pure Appl. Geophys.* 174, 3043–3063 (2017). <https://doi.org/10.1007/s00024-017-1614-y>